



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/764,009	01/17/2001	Masakazu Taguchi	0941.65134	3597
24978	7590	01/14/2005	EXAMINER	
GREER, BURNS & CRAIN 300 S WACKER DR 25TH FLOOR CHICAGO, IL 60606			CHU, KIM KWOK	
			ART UNIT	PAPER NUMBER
			2653	

DATE MAILED: 01/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/764,009	TAGUCHI ET AL.	
	Examiner	Art Unit	
	Kim-Kwok CHU	2653	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on Remarks filed on 4/28/2004.

2a) This action is **FINAL**. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-10 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) Claim(s) _____ is/are allowed.
6) Claim(s) 1-10 is/are rejected.
7) Claim(s) _____ is/are objected to.
8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 28 September 2004 is/are: a) accepted or b) objected to by the Examiner.

 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)
2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) Notice of Informal Patent Application (PTO-152)
6) Other: _____.

Response to Remarks

1. Applicant's Remarks filed on September 28, 2004 have been fully considered.

(a) Applicant states that the prior art of Takahashi does not teach a plurality of detectors of a Viterbi detection unit (page 5 of the Remarks, lines 13 and 14). Furthermore, Applicant states that the prior art of Takahashi teaches "only one decoder with the Maximum likelihood detection unit is provided" (Page 5 of the Remarks, lines 12 and 13). Accordingly, the prior art of Takahashi teaches a Viterbi detection unit 30, 32, 36 having a plurality of detectors 30 and 32. A maximum likelihood detection unit includes partial response equalization with Viterbi detection (page 4 of the Application, paragraph 60). Similarly, the prior art of Takahashi teaches two partial response equalization means 30 and 32 with a maximum likelihood detecting circuit 36. As a result, each equalization means and the maximum likelihood detecting circuit produce its detected signal and therefore each of the combined circuit can be considered as a Viterbi detector means.

(b) Applicant states that Honma does not teach "each of a plurality of detectors of Viterbi detection unit providing a partial response signal with a constraint length' (page 5 of the Remarks, last two lines, page 6 of the Remarks, first two

lines). Accordingly, the prior art of Honma teaches a dual mode PRML decoder where each mode has its own constraint in order to perform the maximum likelihood detection (Figs. 6 and 7; column 4, lines 10-15).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi (U.S. Patent 6,046,874) in view of Honma (U.S. Patent 6,111,835).

Takahashi teaches a data reproduction apparatus very similar to that of the instant invention. For example, Takahashi teaches the following:

(a) as in claim 1, a Viterbi detection unit (Fig. 1);
(b) as in claim 1, the Viterbi detection unit having a plurality of detectors 30, 32 (Fig. 1; detector 30 and 36 is a

Viterbi detection unit, detector 32 and 36 is another Viterbi detection unit);

(c) as in claim 1, the detector 30, 36 providing a first partial response signal with a first constraint length from a first sequence of samples derived from a first readout signal (Fig. 1);

(d) as in claim 1, a connection unit 34 selecting one of connection and disconnection of the plurality of detectors in the Viterbi detection unit in response to a timing signal (Fig. 1);

(e) as in claim 1, the connection of the plurality of detectors is selected by the connection unit 34 (Figs. 1 and 2);

(f) as in claim 1, the Viterbi detection unit 32, 36 provides a second partial response signal with a second constraint length from a second sequence of samples derived from a second readout signal (Fig. 1);

(g) as in claim 1, the second constraint length being different from the first constraint length (Fig. 1; different partial responses);

(h) as in claim 3, a first register PR4 in 94 storing a first expected value corresponding to the first partial response signal with the first constraint length (Fig. 2; column 8, lines 1-4);

(i) as in claim 3, a second register RPR4 in 94 storing a second expected value corresponding to the second partial response signal with the second constraint length (Fig. 2; column 8, lines 1-4);

(j) as in claim 4, one of the first expected value output from the first register and the second expected value output from the second register is selectively set to the Viterbi detection unit in accordance with the timing signal (Figs. 1 and 2; selecting/switching the Viterbi decoder is done by switching circuit 34 in the MPU 48);

(k) as in claim 5, the plurality of detectors include branch metric computation units, add-compare-select units, path metric memories, and pass memories, and wherein the connection unit selects one of connection and disconnection of each of the branch metric computation units, the add-compare-select units, the path metric memories in response to the timing signal (Figs. 1 and 2; column 6, lines 33-35; ACS circuit means in a branch metric calculator is an inherent feature of a Viterbi detector using a maximum likelihood estimation);

(l) as in claim 8, a control unit 48 that controls the connection unit by supplying the timing signal to the connection unit (Fig. 2).

However, Takahashi does not teach the following:

- (a) as in claim 1, each of the Viterbi detector providing its first partial response signal with a first constraint length;
- (b) as in claim 2, the second constraint length is larger than the first constraint length;
- (c) as in claim 5, the detectors include pass memories;
- (d) as in claim 6, when the connection of the plurality of detectors is selected, the connection unit changes internal connections of the pass memories from internal connections of the pass memories when the disconnection of the plurality of detectors is selected; and
- (e) as in claim 7, when the connection of the plurality of detectors is selected, the connection unit changes the individual samples that are supplied to the plurality of detectors, from the individual samples supplied to the plurality of detectors when the disconnection of the plurality of detectors is selected.

Honma teaches the following:

- (a) a dual mode Viterbi decoder (Fig. 1; column 4; lines 10-14);
- (b) the second constraint length is larger than the first constraint length (column 9, lines 42-45);
- (c) the decoder includes pass memories 30 (Figs. 1 and 2);

(d) when the connection of the plurality of detectors is selected, the connection unit changes internal connections of the pass memories from internal connections of the pass memories when the disconnection of the plurality of detectors is selected (Fig. 2; column 5, lines 38-65); and

(e) when the connection of the plurality of detectors is selected, the connection unit changes the individual samples that are supplied to the plurality of detectors, from the individual samples supplied to the plurality of detectors when the disconnection of the plurality of detectors is selected (Fig. 2; column 5, lines 38-65).

Decoding a data sequence accessed from different recording zones requires a Viterbi decoder having a partial response which corresponds to that particular zone's channel characteristics. In order to reduce the number of Viterbi decoding means, it would have been obvious to one of ordinary skill in the art to replace Takahashi's partial response detection means 30 and 32 with Honma's dual mode Viterbi decoder, because the dual mode decoder does not require an additional decoding means equipped with a different partial response while decoding a data sequence with a different channel characteristic.

4. Method claims 9 and 10 are drawn to the method of using the corresponding apparatus claimed in claims 1 and 5. Therefore method claim 8 corresponds to apparatus claim 1 and is rejected for the same reasons of obviousness as used above.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Fisher et al. (5,757,822) is pertinent because Fisher teaches two Viterbi detecting means.

Coker et al. (5,949,831) is pertinent because Coker teaches two Viterbi detecting means.

6. *A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action*

7. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks Washington, D.C.
20231 Or faxed to:

(703) 872-9306 (for formal communications intended for entry. Or:

(703) 746-6909, (for informal or draft communications, please label "PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2021 Crystal Drive, Arlington, VA., Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-4700.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kim CHU whose telephone number is (703) 305-3032 between 9:30 am to 6:00 pm, Monday to Friday.

K 1/10/05

Kim-Kwok CHU
Examiner AU2653
January 10, 2005

(703) 305-3032


TAN DINH
PRIMARY EXAMINER